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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
before the
BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of: MARK H. ENGLERT
Serial No.: 09/718,755

Filed: NOVEMBER 22, 2000

For: ACOUSTICAL TILE CONTAINING WET-STRENGTH RESIN

Examiner: UMAKANT K. RAJGURU

Art Unit: 1711

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Date: July 30, 2004
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APPELLANT'S BRIEF

This is an appeal from the Office Action of March 3, 2004 finally rejecting all claims.

1. REAL PARTY IN INTEREST: The application has been assigned to USG Interiors, Inc., which is a wholly owned subsidiary of USG Corporation, Inc.

2. RELATED APPEALS AND INTERFERENCES: There are no related appeals or interferences.

3. STATUS OF CLAIMS: Claims 1 to 10 are in the case. None have been cancelled. All claims are appealed.

4. STATUS OF AMENDMENTS: No amendments have been filed subsequent to the final rejection.

5. SUMMARY OF INVENTION: The invention relates to compositions for manufacturing acoustical tiles in a water felting process. More particularly, the invention relates to novel binder for acoustical tile compositions in which the conventional starch binder is replaced, in whole or in part, by a water-soluble epichlorohydrin polymer binder, such as a polyamine epichlorohydrin resin. The compositions of the present invention can be fabricated into acoustical tiles using conventional water felting equipment but these compositions can be dried significantly faster (using less energy) than comparable compositions containing conventional starch binders.

6. ISSUES: All claims stand rejected under 35 USC §112, second paragraph, because the percentages of materials recited in claim 1 can total more than 100%.

Claims 1-7 stand rejected as being obvious under 35 USC §103 (a) based on US Patent 5,928,588 to Chen et al, in view of US Patent 6,586,620 to Canorro et al and US Patent 5,911,818 to Baig.

Claims 8-10 stand rejected as being obvious under 35 USC §103 (a) over US Patent 5,928,588 to Chen et al, in view of US Patent 6,586,620 to Canorro et al in further view of US Patent 5,395,571 to Symons.

GROUPING OF CLAIMS:

Group I: Claims 1-7. Independent claim 1 defines a composition suitable for making acoustical tiles in a water-felting process, wherein the binder for the composition consists of up to 7.5% by weight of a reactive water-soluble epichlorohydrin polymer binder and from 0 to 8% by weight of starch. The balance of the composition comprises conventional components in conventional quantities. Claims 2 – 7 are dependent from claim 1 and further define the epichlorohydrin polymer binder.

Group 2: Claims 8-10. Claim 8, which is dependent from claim 1, requires the composition to include a retention aid to promote the aggregation of the water-soluble binder. Claims 9 and 10 are dependent upon claim 8 and further define the retention aid.

7. ARGUMENT:

(A) The §112 rejection of all claims.

The Examiner asserts (in Paragraph 5 of the March 3, 2004 Action) that Claim 1 is indefinite because it does not specify exactly the amounts of materials, other than binder, that are present in the claimed composition. It is submitted that this rejection is in error because Claim 1 recites specific ranges for all of the required components of the acoustical tile composition. A review of the prosecution history of claim 1 shows how the §112 rejection arose.

Claim 1, as filed, defined the composition as "comprising" a light weight aggregate, cellulosic fiber, a reactive water-soluble polymer binder and optionally, mineral wool. The claim did not specify the amounts of any of the materials present in the composition. On August 22, 2002, In response to a §103 prior art rejection, applicant filed Amendment B to amend claim 1 to define the binder as "consisting essentially of a reactive water-soluble polymer binder and optionally, starch."

On November 19, 2002, in response to a continuing prior art rejection, applicant filed a CPA that included Amendment D to further amend claim 1 to define the binder using the restrictive term "consisting of," to wit: "consisting of up to 7.5% by weight of a reactive water-soluble epichlorohydrin polymer binder and from 0 to 8% by weight of starch[1]."

The first rejection under 35 USC §112 appeared in the Action of September 30, 2003, in which the Examiner finally rejected all claims under 35 USC §103 based on newly cited prior art. The Examiner asserted that Claim 1 recited a binder that has "7.5% by wt. of polymer and 8% by wt, of starch" but that the claim was indefinite because it failed to specify the "remaining 84.5%" of the composition.

On December 4, 2003, in response to the §112 rejection, applicant filed Amendment F to Claim 1 to insert the ranges of the lightweight mineral

[1] This language is used in to define the binder in the appealed Claim 1.

aggregate, the cellulosic fiber and the mineral wool, i.e. all of the materials recited by claim 1 other than the binders. Specifically, Claim 1 was amended to recite up to 75% by weight of a lightweight mineral aggregate, up to 25% by weight of a cellulosic fiber, and, up to 85% by weight of mineral wool. The ranges inserted in claim 1 are taken from Table 1 on page 7 of the specification. Claim 1, as amended is reproduced in the Appendix, attached hereto.

In the Final Office Action of March 3, 2004, the Examiner asserted (Paragraph 5) that Claim 1 is indefinite "because it fails specify the remaining 84.5% of the binder." The Examiner argued that "the total amounts of mineral aggregate and cellulosic fiber happens to be 100% ..." which leaves "no room to include binder."

The Examiner appears to be reading the ranges set forth in Claim 1, e.g. "up to 25%", as meaning only the maximum value of the range, e.g. as meaning exactly "25%." It is submitted that this is an unwarranted reading of Claim 1. It is applicant's position that any person skilled in the art would understand that a composition containing "up to 25%" of a component would contain some of that component, but would not necessarily contain 25% of the component. Clearly the range "up to 25%" is satisfied by a smaller amount, such as 20% of the component. Accordingly, it is submitted that the Examiner's reading of the ranges set forth in claim 1 to mean only the maximum amount of the ranges is in error and the §112 rejection should be reversed.

(B) The § 103 rejection of Claims 1-7.

Claims 1-7 stand rejected as being obvious under 35 USC §103 based on US Patent 5,928,588 to Chen et al, in view of US Patent 6,586,620 to Canorro et al and US Patent 5,911,818 to Baig. It is submitted that this rejection is in error because Claim 1 defines a novel binder for an acoustical tile composition that is not obvious in view of the cited prior art.

Claim 1 specifically defines the binder for acoustical tile composition as "consisting of up to 7.5% by weight of a reactive water-soluble epichlorohydrin polymer binder and from 0 to 8% by weight of starch."

Applicant discovered a novel binder for acoustical tile compositions in which the conventional starch binder is replaced, in whole or in part, by a water-soluble epichlorohydrin polymer binder, such as a polyamine epichlorohydrin resin. The compositions of the present invention can be fabricated into acoustical tiles using conventional water felting equipment but these compositions can be dried significantly faster (using less energy) than comparable compositions containing conventional starch binders. The novel binder also enables an acoustical tile having improved properties, such as improved high humidity sag-resistance.

In examining the obviousness of applicant's claims it is important to understand the problems one skilled in the art would face in designing a "composition suitable for making acoustical tile in a water-felting process." As is

explained in the specification (Page 1, line 21 et seq), in the conventional water-felting process,

> "an aqueous slurry of mineral wool, lightweight aggregate, cellulosic fiber, starch binder and other ingredients, as desired or necessary, is flowed onto a moving foraminous support wire, such as that of a Fourdrinier or Oliver mat forming machine, for dewatering. The slurry may be first dewatered by gravity and then dewatered by vacuum suction means to form a basemat. The wet basemat is then pressed (with or without the application of additional vacuum) to the desired thickness between rolls and the support wire to remove additional water. The pressed basemat is then dried in heated drying ovens, and the dried material is cut to the desired dimensions and optionally sanded and/or top coated, such as with paint, to produce acoustical ceiling tiles and panels."

Because the dewatering step required by the water-felting process removes water and any materials dissolved in the water from the basemat, it is necessary to design the acoustical tile composition using components, including the binder, that will remain in the basemat throughout the dewatering step.

The Examiner admits that Chen et al does not disclose either epichlorohydrin resins or starch as binders. Chen et al discloses porous filter structures, which comprise three components. The first component is a "primary media" that may include perlite. The second component is the "green strength agent" that is generally a polyolefin fiber. The third component is the binder, which is generally a polymeric powder. Cationic charged resins, cellulose and metallic fiber, as noted by the Examiner, are disclosed by Chen et al as optional materials that may be used in the filters, although no functional purpose is ascribed to any of these optional materials.

The Chen et al patent teaches the manufacture of filters using a "dry laying" process (see Col 7 line 29 et seq.). The Chen et al patent pointedly declares that the process "does not involve the formation of a wet slurry," and "vacuuming or other steps to remove liquid are not necessary." (Col. 7, lines 50-53) Accordingly, all of the components of the Chen et al composition, including the water-soluble components, are retained in the filters made by the "dry laying" process.

Chen et al does not suggest the manufacture of an acoustical tile nor does it suggest that any product should be produced using a water felting process, as required by applicant's claims. Chen et al teaches away from the water-felting process used by applicant because Chen et al uses a "dry laying" process. Indeed, Chen et al specifically declares that the formation of a slurry is not involved and steps to remove water are not necessary. (See Col. 7, line 50). Accordingly Chen et al fails to make obvious the manufacture of acoustical tile compositions using conventional water felting processes and equipment with improved efficiency. Specifically, Chen et al fails to suggest acoustical tile compositions that can be dried significantly faster than comparable compositions containing conventional starch binders.

To summarize, Chen et al does not disclose the specific "reactive water-soluble epichlorohydrin polymer binder" required by all of applicant's claims. Most importantly, Chen et al fails to suggest the substitution of a polyamine epichlorohydrin resin for a conventional starch binder in an acoustical tile composition and fails to suggest that such a composition produces ceiling tile

having improved properties, such as improved drying properties and improved high humidity sag-resistance. Finally, Chen et al fails to disclose any composition suitable for use in a water-felting process. It follows that Chen et al fails to make obvious any of applicant's claims.

Conorro et al is cited because it discloses the use of epichlorohydrin resins in aqueous coating compositions. The Conorro et al coating compositions comprise a water-soluble thermosetting material, such as an epichlorohydrin resin (Component A) and a water-insoluble film-forming polymer (Component B). The coatings may be applied to a wide variety of substrates, including ceiling tiles (See Abstract). Conorro et al teaches nothing about making acoustical tile compositions or any other product produced through a water-felting process.

Baig is cited to show a starch binder in an acoustical tile composition. Starch is a conventional acoustical tile binder that applicant has replaced with a water-soluble epichlorohydrin resin. Baig does not suggest replacing the starch binder with a water-soluble epichlorohydrin resin nor does Baig suggest the improved properties discovered by applicant.

It is submitted Claim 1 is not obvious because neither Conorro et al nor Chen et al teach compositions suitable for making an acoustical tile or any product that could be made in a water-felting process. Adding the epichlorohydrin resin from the Conorro et al coating composition to the Chen et al porous filter structure, as suggested by the Examiner, would not produce a compositions suitable for making an acoustical tile or any product that could be

made in a water-felting process, as claimed by applicant. Neither reference gives any reason why one skilled in the art should replace the Chen et al polymeric powder binders with the water-soluble epichlorohydrin resin of Conorro et al. If the Chen et al binder were replaced with water-soluble epichlorohydrin resin, presumably the resulting composition would be used in the Chen et al "dry laying" process to make filters. Moreover, the combination of references fails to suggest any composition having a "binder consisting of up to 7.5% by weight of a reactive water-soluble epichlorohydrin polymer binder and from 0 to 8% by weight of starch" as required by applicant's claims. The advantages achieved by applicant's invention are not made obvious by the cited art. The cited art clearly fails to make obvious any of applicant's claims.

Accordingly, It is submitted that the §103 rejection based on Chen et al, Canorro et al and Baig is in error because the prior art fails to make obvious the novel binder for an acoustical tile composition defined by claim 1 and that the rejection should be reversed.

(C.) The § 103 rejection of claims 8-10.

Claims 8-10 stand rejected over US Patent 5,928,588 to Chen et al, in view of US Patent 6,586,620 to Canorro et al in further view of US Patent 5,395,571 to Symons. It is submitted that this rejection is in error because Claim 8 defines an acoustical tile composition that includes a retention aid that is not taught by the prior art.

Claim 8 requires the use of a retention aid that promotes the aggregation of the binder. As is explained above, the water-felting process includes a dewatering step that removes water and any materials dissolved in the water from the basemat. It is obviously necessary that the binder remain in the basemat throughout the dewatering step. The retention aid defined by claim 8 promotes the aggregation of the binder in order to minimize the loss of binder in the dewatering step. However, as those skilled in the art would understand, the retention aid should not thicken the overall composition entering the water-felting process because any thickening would interfere with the dewatering step.

Applicant's specification defines the retention aid at pages 9 and 10 as:

> "The retention aids used in the present invention can be any of a number of polymers that promote aggregation by bridging between particles and/or molecules. These retention aids possess some residual negative charge, which acts to form an agglomerate with the cationic wet strength resin. It is this agglomerate of resin and retention aid that is then retained within the forming basemat as water is removed during the forming process."

The specification goes on to name several retention aids, one of which is "Hercules CMC-7MT, a technical grade of sodium carboxymethylcellulose."

In the Final Rejection, the Examiner admitted that the 3 cited references fail to mention the retention aid of Claims 8-10[2], but the Examiner argues that it would be obvious to use "the sodium carboxymethyl cellulose (of Symons) with

[2] See page 3, last paragraph of the Final Rejection.

the expectation of minimizing the loss of binder due to the ability of the cellulose to thicken the composition[3]."

The Symons patent teaches a method for making a foamed building board consisting primarily of calcium sulfate hemihydrate (i.e., stucco), a thermosetting resin, foam and other minor ingredients. Symons describes the use of sodium carboxymethyl cellulose as an optional component to retard the hydration of the calcium sulfate hemihydrate. Symons does not teach the use of the sodium carboxymethyl cellulose as a thickener or as a retention aid for the epichlorohydrin resin. The Examiner offers no reason why one skilled in the art would select a retarder from a calcium sulfate hydration process for use as a retention aid for a epichlorohydrin resin in a water-felting process. Even if the sodium carboxymethyl cellulose was known to be a thickener, as the Examiner argues, those skilled in the art would not use want to use any thickening agent in a composition destined for a water-felting process because a thickening agent would clearly interfere with dewatering process. The teachings of Symons simply do not support the Examiner's argument for obviousness.

Accordingly, it is submitted that the obviousness rejection based on Chen et al, in view of US Patent 6,586,620 to Canorro et al in further view of US Patent 5,395,571 to Symons is in error because the prior art fails to suggest the addition of a retention aid to an acoustical tile composition based on an epichlorohydrin

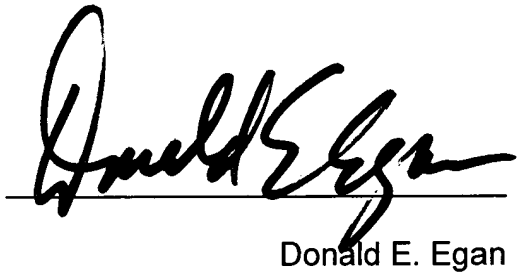
[3] See page 4, second paragraph of the Final Rejection.

binder as defined by claim 8. Therefore, the §103 rejection of Claims 8-10 is in error and should be reversed should be reversed.

Conclusion.

It is submitted that all of the claims in issue meet the standards of 35 USC §112 and are patentable over the prior art. Reconsideration of all grounds of rejection is respectfully requested in the light of the foregoing amendment and remarks and an early Notice of Allowance is solicited.

Respectfully submitted,



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8. APPENDIX

1. (amended) A composition suitable for making acoustical tiles in a water-felting process, said composition comprising up to 75% by weight of a lightweight mineral aggregate, up to 25% by weight of a cellulosic fiber, a binder and, optionally, up to 85% by weight of mineral wool, said binder consisting of up to 7.5% by weight of a reactive water-soluble epichlorohydrin polymer binder and from 0 to 8% by weight of starch.

2. (original) The composition described in claim 1, wherein said binder has a cationic charge.

3. (original) The composition described in claim 2, wherein said binder has positively charged azetidinium groups.

4. (original) The composition described in claim 3, wherein said binder is a polyamine epichlorohydrin resin binder.

5. (original) The composition described in claim 4 comprising up to 4.0% of polyamine epichlorohydrin resin based on the dry weight of the composition.

6. (original) The composition described in claim 5 comprising about 2.5% of polyamine epichlorohydrin resin based on the dry weight of the composition.

7. (original) The composition described in claim 1, wherein said binder comprises a reactive water-soluble cationic polymer and starch.

8. (previously amended) The composition described in claim 1, comprising retention aid that promotes aggregation of said water soluble binder.

9. (original) The composition described in claim 8, wherein said retention aid is a polymeric material that possesses a residual negative charge.

10. (original) The composition described in claim 8, wherein said retention aid is selected from the group consisting of a guar-based product with both cationic and anionic functionality, sodium carboxymethyl cellulose, a water-soluble low molecular weight anionic polyacrylic resin and mixtures thereof.